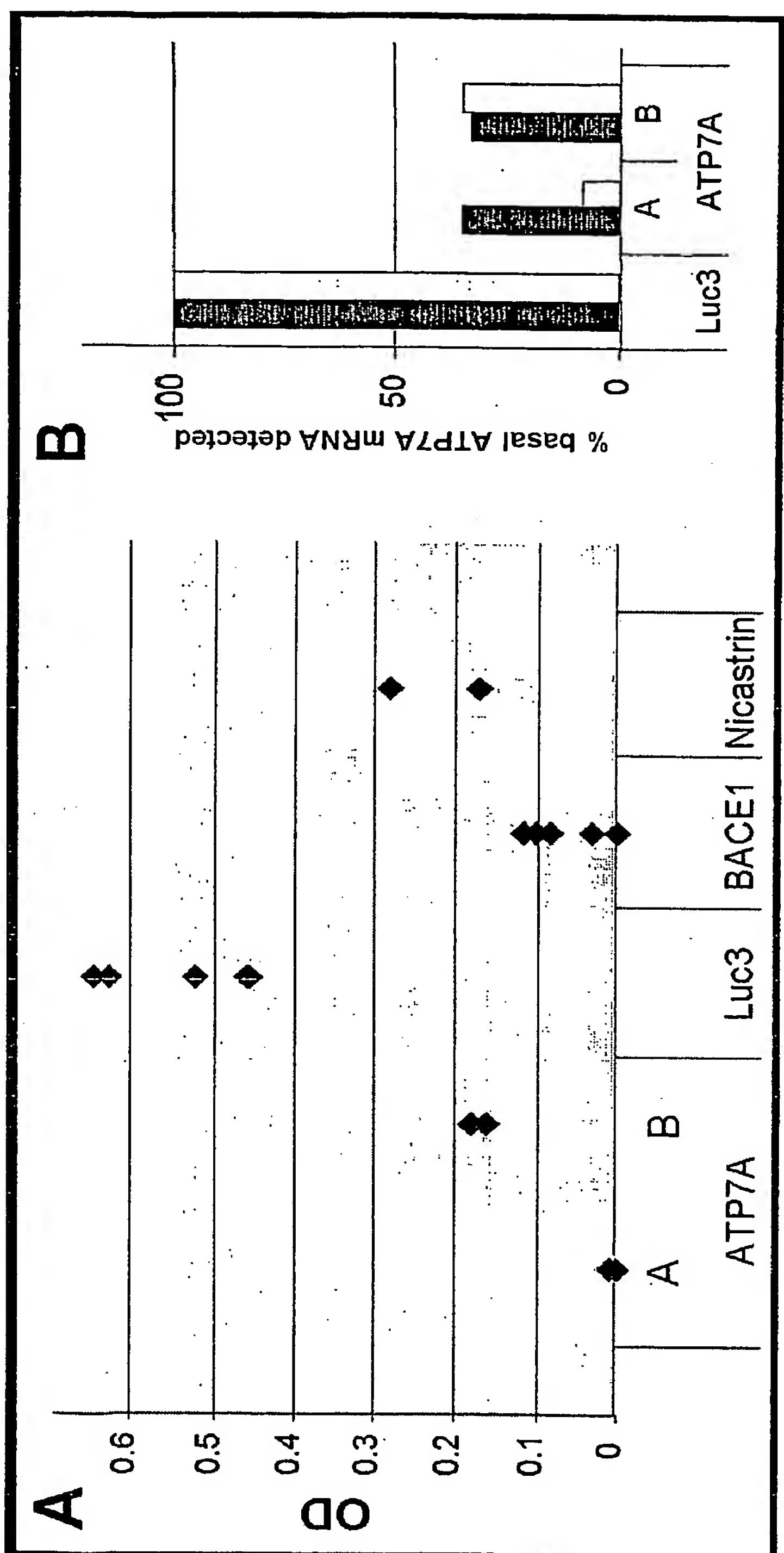


**Figure 1:**

**Figure 2:**

MRKLSIRKRD NNLLKPSSAS SLGIAVSLGR PVLSRSSSGT VNLLEEVGLH  
IRDTAFSSTK LLEAISTVSA QVEELAVHNE CYDPSMGVNS VTISVEGMTC  
NSCVWTIEQQ IGKVNGVHHI KVSLEEKNAT IIYDPKLQTP KTLQEAIIDM  
GFDAVIHNPD PLPVLTDTLF LTVTASLTLP WDHIQSTLLK TKGVTDIKIY  
PQKRTVAVTI IPSIVNANQI KELVPELSDL TGTLKKSGA CEDHSMAQAG  
EVVLKMKVEG MTCHSCTSTI EGKIGKLQGV QRIKVSLDNQ EATIVYQPHL  
ISVEEMKKQI EAMGFPAFK KQPKYLKLG A IDVERLKNT P VKSSEGSQQR  
SPSYTNSTA TFIIDGMHCK SCVSNIESTL SALQYVSSIV VSLENRSAIV  
KYNASSVTPE SLRKAIEAVS PGLYRVSITS EVESTSNSPS SSSLQKIPLN  
VVSQPLTQET VINIDGMTCN SCVQSIEGVI SKKPGVKSIR VSLANSNGTV  
EYDPLLTSPE TLRGAIEDMG FDATLSDTNE PLVVIAQPSS EMPLLTSTNE  
FYTKGMTPVQ DKEEGKNSSK CYIQVTGMTC ASCVANIERN LRREEGIysi  
LVALMAGKAE VRYNPAPIQP PMIAEFIREL GFGATVIENA DEGDGVLELV  
VRGMTCASCV HKIESSLTKH RGILYCSVAL ATNKAHIKYD PEIIGPRDII  
HTIESLGFEA SLVKKDRSAS HLDHKREIRQ WRRSFLVSLF FCIPVMGLMT  
YMMVMDHHFA TLHHNQNMSK EEMINLHSSM FLERQILPGL SVMNLLSFLL  
CVPVQFFGGW YFYIQAYKAL KHKTANMDVL IVLATTIAFA YSLIILLVAM  
YERAKVNPI T FFDTPPMLFV FIALGRWLEH IAKGKTSEAL AKLISLQATE  
ATIVTLDSDN ILLSEEQVDV ELVQRGDIIK VVPGGKFPVD GRVIEGHSMV  
DESLITGEAM PVAKKPGSTV IAGSINQNGS LLICATHVGA DTLSQIVKL  
VEEAQTSKAP IQQFADKLSG YFVPFIVFVS IATLLVWIVI GFLNFEIVET  
YFPGYNRIS RTETIIRFAF QASITVLCIA CPCSLGLATP TAVMVGTGVG  
AQNGILIKGG EPLEMAHKVK VVVFDTGTI THGTPVWNQV KVLTESNRIS  
HHKILAIIVGT AESNSEHPLG TAITKYCKQE LDTETLGTCI DFQVVPAGCGI  
SCKVTNIEGL LHKNWNIED NNIKNASLVQ IDASNEQSST SSSMIIDAQI  
SNALNAQQHK VLIGNREWMI RNGLVINNDV NDFMTEHERK GRTAVLVAVD  
DELCGLIAIA DTVKPEAELA IHILKSMGLE VVLMTGDNSK TARSIASQVG  
ITKVFAEVLP SHKVAVKQL QEEGKRVAMV GDGINDSPAL AMANVGIAIG  
TGTDVAIEAA DVVLIRNDLL DVVASIDL SR KTVKRIRINF VFALIYNLVG  
IPIAAGVFMP IGLVLQPWMG SAAMAASSVS VVLSSLFLKL YRKPTYESYE  
LPARSQIGQK SPSEISVHVG IDDTSRNSPK LGLLDRIVNY SRASINSLLS  
DKRSLNSVVT SEPDKHSLLV GDFREDDTA L

**Figure 3:**

ATP7A MRKLSIRKRDNNLLKPSSA~~SSLGIAVSLGRPVLSRSSSGT~~VNLLEEVGLHIRDTAFSSTKLLEAISTVSAQVEELAVHNE  
ATP7B ----MPEQERQITAREGAS-----RNILSKLSPTR-----AWEPMKKSFADFNVGYEGG-----LD  
Consensus/80% .....b.cp-pplh..ptAS.....R.1LS+.S.ST.....hb-sAbpp\*bhb-slth.tt.....

ATP7A CYD~~ESMGVNSVTISVEGMTCN~~CVWTLQQIGKVN~~GVRHHIKVSLEEKNA~~TIIYD~~EKLQTPKT~~LQEAI~~DDMGFD~~A~~VT~~HNP~~D~~  
ATP7B GLGESSQVATSTVRILG~~MTCQSCVKSIEDRISNLKG~~IISMKV~~SLEQDSATV~~KYV~~SVVCLQQVCHQ~~IGDMGFEASIA---  
Consensus/80% sbsPS..Vs\*sTlpbGMTCpSCVb\*I~~EppItplpGlbpbKVSLEpc~~sAT1bYsPpl.s.pplpc.I~~s~~DMGF-Asi~~h~~...

ATP7A PLPVLTDTLF~~LTVTASLTL~~PWDHIQSTLLKGVTD~~DIKIY~~PQKRTVAVTIIPSIVNANQI~~KELVPELS~~LDTGT~~LEK~~SGA  
ATP7B -----ECKAAS  
Consensus/80% .....E.Kttt

ATP7A CEDHSMAQAGEVVLKM~~KVEGMTCHSCT~~STIEGKIGKLOGVORIKV~~SLNOEATIVY~~O~~EHL~~ISVEEMKKQIEAMGF~~PA~~V~~K~~  
ATP7B WPSRSLP-AQEA~~VVKLRVEGMTCQSCVSS~~TEGKV~~RKLQGV~~VRV~~KV~~S~~NQEAVITY~~O~~YLIOPE~~D~~LRDHV~~N~~DMGF~~AAIK  
h.s+Sbs.A.EsV1Kb+VEG~~MTCpSCS~~\*IEGK1.KLQGV.R1KV~~SLsNQEAs~~I~~sYQP~~aL~~ips~~E-b+cplpsMGF.Ah1K

ATP7A KQPKY~~IKLGAIDVERIKNT~~EV~~KSEGSQORSPSYTNDS~~-----TATFI~~IDGMHCKSCV~~SNIESTLSA~~LOQVSS~~IVVS  
ATP7B SKVAP~~LSLGPTIDIERI~~Q~~STNPKR~~EL~~SSANQFN~~NSETLG~~HQGSHV~~VLQLRIDGMHCKSCV~~LN~~TEENIGOLLGV~~OSI~~QVS  
Consensus/80% pps..LpLGsID1ERL~~psT~~....P~~lp~~St~~p~~.sbppS.\*bsppt....Thpbb~~IDGMHCKSCV~~.NIEpslt.LbhVp~~SI~~.vs

ATP7A LENRSAIVKYNASSVT~~ESIRKAIEAVS~~GLYRV~~SITSEVES~~--TSNSP~~SSSLQKIE~~LN~~VVSQPLTQET~~V~~INIDGMTC~~  
ATP7B LENKTAQV~~KYDP~~SC~~TS~~VALQRA~~IEALP~~GNFKV~~SLPDGAEGSG~~TD~~HRS~~SS~~SHPGS~~PRNQV~~QGTC~~ST~~TL~~TA~~AGMTCA~~  
Consensus/80% LEN+\*AbV~~KYssSs~~\*P.t~~lp~~+AIEA~~lsPG.a~~+VS~~lss.s~~E..Tspps~~SSSp~~....P.ps.sQshspp~~Tl~~Is~~is~~GMTCs

ATP7A SCVQ~~SIEGVISKPGVKSIRV~~SLANSNGT~~VEYD~~LL~~TS~~ET~~LRGATEDM~~GFAT~~LS~~TNEPLVV~~TAQPSSEMPL~~LT~~ST~~IN-  
ATP7B SCV~~HSLEGMSOLEGVQOISV~~SLAE~~GTTAVLYN~~SV~~IS~~EE~~ELRAATEDM~~GF~~ASV~~V~~SE~~C~~ST~~IN~~PLGNH~~SAGNSM~~VQT~~DG  
Consensus/80% SCVp~~SIEGH~~ISpb.GV~~ppIpVSLAptst~~TVbYsP.1hS~~pep~~LRt~~AIEDM~~GF-A\*1ssps~~ps~~h~~ss~~l~~tp~~.St..sblp\*T~~s~~.

ATP7A -EFYTKG~~MTVQDKEEGK~~N-----SKCYIQVTG~~MTCASC~~V~~ANIERNLRE~~EGIY~~SI~~LV~~ALMAGKAE~~VR  
ATP7B TPTSVQ~~EV~~A~~HTGRLP~~AN~~HAD~~PL~~A~~K~~S~~P~~Q~~STR~~A~~V~~A~~P~~Q~~K~~C~~F~~L~~Q~~I~~K~~G~~M~~T~~C~~A~~S~~C~~V~~S~~N~~I~~ER~~NL~~Q~~K~~E~~A~~G~~V~~L~~S~~V~~U~~LMAGKAE1+  
Consensus/80% ..h.sp.hsPhps+b.tppt.....pKCa1Q1pG~~MTCASC~~V~~t~~NI~~ERNL~~p+E.G1b~~s~~1LV~~ALMAGKAE~~1+

ATP7A MN~~AVTO~~PMIAE~~FI~~REL~~GEGAT~~V~~EN~~ADEGD~~G~~V~~LE~~L~~V~~V~~R~~G~~MTCASC~~V~~H~~K~~I~~E~~SS~~L~~T~~K~~H~~R~~G~~I~~L~~Y~~C~~S~~V~~A~~L~~T~~N~~K~~A~~H~~I~~K~~Y~~D~~E~~  
ATP7B YD~~EVTO~~PL~~E~~TA~~QF~~I~~QD~~L~~G~~EE~~AA~~VM~~EDYAGSDG~~N~~I~~E~~L~~T~~I~~T~~G~~M~~T~~C~~A~~S~~C~~V~~N~~I~~E~~SK~~I~~TR~~NG~~IT~~Y~~A~~S~~V~~AL~~A~~T~~S~~K~~A~~V~~K~~F~~D~~E~~  
Consensus/80% YsP.VIQP.bIApF~~I~~p-LGF.AsVbEshs.tDGs1ELs1pG~~MTCASC~~V~~H~~pIESp~~L~~+ppGIhysSVALATsKAb1KadPE

ATP7A IIG~~RD~~I~~HT~~IESLG~~FEA~~SLVKKDR~~S~~A~~SHLD~~H~~K~~RE~~TR~~Q~~RR~~S~~F~~VL~~S~~FF~~C~~-----V~~MGLMT~~Y~~MM~~MD~~HH~~F~~AT~~L~~HH~~QN~~MS~~KE~~E~~  
ATP7B IIG~~RD~~E~~IK~~H~~EE~~I~~GE~~H~~AS~~I~~Q~~R~~N~~P~~NA~~H~~LD~~H~~K~~M~~E~~I~~K~~W~~K~~K~~S~~F~~L~~C~~I~~V~~F~~G~~I~~-----V~~MA~~LM~~Y~~ML~~I~~PS~~N~~  
Consensus/80% IIGPRDII+hIEp1GFcASLsp+s.sApHLDHKbE1+QW++SFLs~~SLhFs~~IPV~~Mt~~l~~Mh~~Y~~Mb~~l.sp.....

ATP7A MINLH~~SSMF~~LERQ~~TL~~GLS~~V~~M~~N~~LLS~~F~~LC~~V~~P~~V~~OFFGGWYFYI~~QAY~~K~~A~~K~~H~~K~~T~~A~~N~~M~~D~~V~~L~~IV~~L~~ATT~~I~~A~~F~~X~~S~~L~~I~~ILLV~~AM~~Y~~E~~  
ATP7B --EP~~QSMV~~l~~DH~~N~~I~~I~~G~~L~~S~~I~~L~~N~~I~~F~~I~~C~~T~~F~~V~~Q~~L~~LG~~GWY~~FYI~~QAY~~K~~S~~L~~R~~H~~S~~A~~N~~M~~D~~V~~L~~IV~~L~~AT~~S~~I~~AY~~V~~S~~L~~V~~IL~~W~~V~~VA~~E  
Consensus/80% ..p.HpSmhL--pI1PGLS1bN11.F1LCs.V.Q~~bbGGWY~~FYI~~QAY~~K~~t~~L~~H~~++ANMDVLIV~~L~~AT\*IAasY~~S~~L~~1~~IL~~1~~V~~Ah~~E

ATP7A RAKV~~N~~LT~~FF~~DT~~T~~MLF~~V~~PI~~AL~~GR~~W~~LE~~H~~I~~A~~G~~K~~K~~T~~SE~~A~~L~~A~~K~~L~~I~~S~~LO~~Q~~ATE~~A~~T~~V~~T~~L~~GD~~N~~L~~I~~SEE~~QVD~~VEL~~V~~ORG~~D~~I~~1~~K~~V~~  
ATP7B KAERS~~V~~T~~FF~~DT~~T~~MLF~~V~~PI~~AL~~GR~~W~~LE~~H~~L~~A~~K~~S~~K~~T~~SE~~A~~L~~A~~K~~L~~I~~S~~LO~~Q~~ATE~~A~~T~~V~~T~~L~~GD~~N~~L~~I~~REE~~QV~~M~~E~~L~~V~~ORG~~D~~I~~1~~K~~V~~  
Consensus/80% +Ac.sP1TFFDT~~PP~~MLF~~V~~PI~~AL~~GR~~W~~LE~~H~~I~~A~~K~~t~~K~~T~~SE~~A~~L~~A~~K~~b~~SL~~Q~~ATE~~A~~T~~V~~T~~L~~spDN111pEEQV~~s~~HELV~~Q~~RG~~D~~I~~1~~K~~V~~

ATP7A IGGKF~~V~~D~~GRV~~I~~E~~G~~H~~S~~M~~V~~D~~E~~S~~L~~I~~T~~G~~E~~AM~~-----V~~A~~K~~V~~K~~G~~T~~V~~S~~I~~N~~Q~~G~~S~~L~~I~~C~~A~~T~~H~~V~~G~~A~~D~~T~~T~~L~~S~~Q~~I~~V~~K~~L~~V~~EE~~A~~Q~~S~~K~~A~~-----I~~Q~~  
ATP7B EGGKF~~V~~D~~GK~~V~~I~~E~~G~~N~~T~~M~~A~~E~~S~~L~~I~~T~~G~~E~~AM~~-----V~~T~~K~~K~~G~~T~~V~~I~~A~~S~~I~~N~~H~~G~~S~~V~~I~~K~~A~~T~~H~~V~~G~~N~~D~~T~~L~~A~~Q~~I~~V~~K~~L~~V~~EE~~A~~Q~~S~~K~~A~~-----I~~Q~~  
Consensus/80% PGGKF~~P~~VG~~D~~G+V.1EGp\*M~~s~~D~~E~~S~~L~~I~~T~~G~~E~~A~~M~~P~~V~~s~~K~~PG~~S~~TV~~I~~A.SIN.pG~~S~~1L~~i~~p~~A~~TH~~V~~G~~s~~DT~~L~~t~~Q~~I~~V~~K~~L~~VE~~E~~A~~Q~~h~~S~~K~~A~~-----I~~Q~~

ATP7A Q~~F~~AD~~KL~~SG~~Y~~F~~V~~-----F~~I~~V~~F~~V~~S~~I~~A~~T~~L~~L~~W~~W~~V~~I~~V~~I~~G~~F~~N~~E~~I~~V~~E~~T~~Y~~F~~V~~-----G~~Y~~N~~R~~S~~I~~S~~R~~T~~E~~T~~I~~I~~R~~F~~A~~Q~~O~~S~~I~~T~~V~~L~~C~~I~~A~~C~~C~~-----CS~~L~~G~~L~~A~~T~~TA~~Q~~  
ATP7B Q~~b~~AD~~+b~~SG~~Y~~F~~V~~P~~F~~Il~~b~~Sh~~H~~T~~L~~1~~V~~W~~V~~I~~V~~I~~G~~F~~1~~f~~S~~.1V~~pp~~y~~F~~P~~s~~.N+p~~I~~S~~p~~T~~E~~I~~R~~F~~A~~F~~Q~~s~~S~~I~~T~~V~~L~~C~~I~~A~~C~~P~~S~~L~~G~~L~~A~~PT~~A~~  
Consensus/80%

ATP7A VM~~V~~G~~T~~G~~V~~G~~A~~Q~~N~~G~~I~~L~~I~~K~~G~~G~~E~~-----LEMAH~~K~~V~~V~~V~~F~~D~~K~~T~~G~~T~~I~~H~~G~~T~~V~~W~~N~~Q~~V~~K~~V~~L~~T~~E~~N~~R~~I~~S~~H~~K~~I~~A~~I~~V~~G~~T~~A~~E~~S~~N~~S~~E~~R~~-----LG~~T~~A~~Q~~  
ATP7B VM~~V~~G~~T~~G~~V~~A~~Q~~N~~G~~I~~L~~I~~K~~G~~G~~G~~E~~-----LEMAH~~K~~K~~T~~V~~M~~F~~D~~K~~T~~G~~T~~I~~H~~G~~V~~W~~R~~M~~V~~L~~L~~G~~D~~V~~A~~T~~I~~PL~~R~~K~~V~~L~~A~~V~~V~~G~~T~~A~~E~~S~~S~~E~~H~~-----LG~~V~~A~~Q~~  
Consensus/80% VM~~V~~G~~T~~G~~V~~I~~A~~Q~~N~~G~~I~~L~~I~~K~~G~~G~~E~~-----LEMAH~~K~~K~~I~~K~~S~~V~~h~~F~~D~~K~~T~~G~~T~~I~~H~~G~~S~~P.V.pvb1Ls-ssp1sb+K1~~I~~A~~I~~V~~G~~T~~A~~E~~t~~s~~SE~~H~~P~~L~~G~~S~~A~~

ATP7A IT~~KY~~C~~Q~~E~~L~~D~~T~~E~~T~~L~~G~~T~~C~~I~~D~~F~~Q~~V~~V~~-----GGG~~I~~S~~C~~K~~V~~T~~N~~I~~E~~G~~L~~L~~H~~K~~N~~N~~W~~N~~I~~E~~D~~NN~~I~~K~~N~~A~~S~~L~~V~~Q~~I~~D~~A~~S~~N~~E~~Q~~S~~S~~T~~S~~S~~M~~I~~I~~D~~A~~Q~~I~~S~~N~~-----V~~T~~K~~Y~~C~~E~~E~~L~~G~~T~~E~~T~~L~~G~~T~~C~~D~~F~~Q~~A~~V~~V~~-----ERPLs~~A~~P~~A~~SH~~L~~N~~E~~A~~G~~S~~L~~P~~A~~E~~K~~D~~A~~V~~P~~  
ATP7B 1~~T~~K~~Y~~C~~K~~E~~L~~D~~T~~E~~T~~L~~G~~T~~C~~I~~D~~F~~Q~~V~~V~~-----GGG~~I~~S~~C~~K~~V~~T~~N~~I~~E~~G~~L~~L~~H~~K~~N~~N~~W~~N~~I~~E~~D~~NN~~I~~K~~N~~A~~S~~L~~V~~Q~~I~~D~~A~~S~~N~~E~~Q~~S~~S~~T~~S~~S~~M~~I~~I~~D~~A~~Q~~I~~S~~N~~-----V~~T~~K~~Y~~C~~E~~E~~L~~G~~T~~E~~T~~L~~G~~T~~C~~D~~F~~Q~~A~~V~~V~~-----ERPLs~~A~~P~~A~~SH~~L~~N~~E~~A~~G~~S~~L~~P~~A~~E~~K~~D~~A~~V~~P~~  
Consensus/80% 1~~T~~K~~Y~~C~~K~~E~~L~~D~~T~~E~~T~~L~~G~~T~~C~~I~~D~~F~~Q~~V~~V~~-----GGG~~I~~S~~C~~K~~V~~T~~N~~I~~E~~G~~L~~L~~H~~K~~N~~N~~W~~N~~I~~E~~D~~NN~~I~~K~~N~~A~~S~~L~~V~~Q~~I~~D~~A~~S~~N~~E~~Q~~S~~S~~T~~S~~S~~M~~I~~I~~D~~A~~Q~~I~~S~~N~~-----V~~T~~K~~Y~~C~~E~~E~~L~~G~~T~~E~~T~~L~~G~~T~~C~~D~~F~~Q~~A~~V~~V~~-----ERPLs~~A~~P~~A~~SH~~L~~N~~E~~A~~G~~S~~L~~P~~A~~E~~K~~D~~A~~V~~P~~

ATP7A ALNAQQH~~K~~V~~V~~V~~I~~N~~R~~W~~M~~R~~N~~G~~L~~V~~I~~N~~D~~V~~N~~F~~M~~T~~E~~H~~E~~R~~K~~G~~R~~T~~A~~V~~L~~V~~A~~D~~D~~G~~D~~L~~G~~I~~A~~-----I~~A~~D~~T~~V~~K~~P~~E~~A~~L~~A~~T~~H~~I~~L~~K~~S~~M~~G~~L~~E~~V~~  
ATP7B ---Q~~F~~FS~~V~~L~~I~~N~~R~~W~~M~~R~~N~~G~~L~~V~~I~~N~~D~~V~~N~~F~~M~~T~~E~~H~~E~~R~~K~~G~~R~~T~~A~~V~~L~~V~~A~~D~~D~~G~~D~~L~~G~~I~~A~~-----I~~A~~D~~T~~V~~K~~P~~E~~A~~L~~A~~T~~H~~I~~L~~K~~S~~M~~G~~L~~E~~V~~  
Consensus/80% ....Q~~p~~ap~~V~~L~~I~~N~~R~~W~~b~~B~~R~~N~~G~~L~~S~~I~~s~~D~~V~~s~~D~~h~~M~~T~~-~~H~~e~~b~~K~~G~~p~~T~~A~~1~~V~~A~~I~~D~~s~~s~~V~~K~~b~~I~~A~~D~~s~~V~~K~~.E.A.L~~A~~H~~h~~L~~p~~S~~M~~G~~1~~-V~~V~~

ATP7A LMTGDN~~S~~K~~T~~AR~~S~~I~~A~~S~~Q~~V~~G~~I~~T~~K~~V~~F~~A~~E~~V~~L~~W~~SH~~K~~V~~A~~K~~V~~Q~~L~~Q~~E~~G~~X~~R~~V~~A~~M~~G~~D~~G~~I~~N~~D~~S~~S~~-----A~~L~~A~~M~~N~~V~~G~~I~~A~~I~~G~~T~~G~~I~~D~~V~~A~~I~~E~~A~~ADV~~S~~  
ATP7B LITGDN~~R~~K~~T~~AR~~A~~I~~A~~T~~O~~V~~G~~I~~N~~K~~V~~F~~A~~E~~V~~L~~W~~SH~~K~~V~~A~~K~~V~~Q~~L~~Q~~E~~G~~X~~R~~V~~A~~M~~G~~D~~G~~I~~N~~D~~S~~S~~-----A~~L~~A~~Q~~ADM~~G~~V~~I~~G~~T~~G~~I~~D~~V~~A~~I~~E~~A~~ADV~~S~~  
Consensus/80% Lb~~T~~G~~D~~n~~p~~K~~T~~Ar~~I~~A~~\*~~Q~~V~~g~~I~~s~~K~~V~~F~~A~~E~~V~~L~~PS~~H~~K~~V~~A~~K~~V